Impact of *Methylobacterium* inoculation on potato (*Solanum tuberosum* L) productivity and disease resistance is modulated by the interaction with the resident endophyte community and environmental conditions.

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One of the limiting factors for the use of microbial fertilizers and biocontrol agents in the large-scale industrial agriculture their unstable effect which is dependent on the plant genotype (species and even cultivar) and environmental conditions. Earlier we have demonstrated in the series of *in vitro* and greenhouse experiments that endophytic *Methylobacterium* sp. IMBG290 had a varying effects on potato disease resistance, possibly modulated through the endophyte community of the host.

In the current study we were interested to explore biofertilizer and biocontrol properties of IMBG290 in field. We have conducted 2-years field trial using 3 potato cultivars, where potato tubers have been treated with IMBG290, complex microbial biofertilizer KLEPS® alone or with their combination. Potato sprouting, productivity, resistance to herbivores (as damage of potato tubers with the wireworm and chafer larvae) and towards naturally occurring bacterial and fungal diseases (dry rot, soft rot, potato scab and canker) have need recorded. Terminal restriction fragment length polymorphism (T-RFLP) - based fingerprinting of the endophytic bacterial and fungal communities has been conducted.

1. Increase in potato sprouting, productivity, pest and disease resistance was associated with *Methylobacterium*-induced shift in bacterial and fungal endophytic communities. Since endophytic communities were highly genopype-specific among potato cultivars tested, it suggest the importance of microbe-microbe interactions in the effect of microbial agents on the plant fitness.
2. Combined inoculation with IMBG290® and KLEPS led to enhanced resistance of one potato cultivar towards the canker, susceptibility of another cultivars towards the dry rot and canker and varying effect was observed in the third cultivar tested (enhanced resistance towards the wireworm and susceptibility towards chafer larvae damage) compared with the single treatments. Variations in such superposition effect require more attention when designing complex microbial biofertilizers.
3. While the climatic conditions in 2011 (temperature and precipitation) have been more favorable for potato production comparing with 2012, there were more cultivar-treatment combinations that led to increased potato productivity observed in 2011 in our experiment. This may mean more prominent effect of microbial biofertilizers in the harsh environmental conditions, what deservers more attention in the practical agriculture.